

**“EVALUATION OF COMPARATIVE STUDY OF COMPLICATIONS  
(POST-OPERATIVE) IN CATARACT SURGERY WITH IOL  
(ANTERIOR & POSTERIOR CHAMBER IMPLANT)”**

**THESIS  
FOR  
MASTER OF SURGERY  
(OPHTHALMOLOGY)**



**BUNDELKHAND UNIVERSITY  
JHANSI (U. P.)**

C E R T I F I C A T E

This is to certify that the work entitled "EVALUATION OF COMPARATIVE STUDY OF COMPLICATIONS (POST-OPERATIVE) IN CATARACT SURGERY WITH IOL (ANTERIOR & POSTERIOR IMPLANT)" which is being submitted as a thesis for M.S. (OPHTHALMOLOGY) has been carried out by Dr. Lalji in the Department of Ophthalmology under our direct supervision and guidance.

The techniques and methods described were performed by the candidate himself and the observations have been periodically checked by us.

He has put in the necessary period of stay in the department according to University regulations.



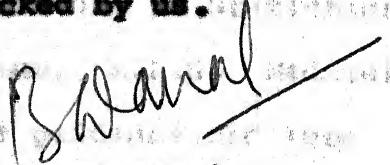
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## ACKNOWLEDGEMENT

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It is very difficult to express in words the sense of gratitude and reverence to my esteemed teacher and Chief Guide Dr. G.D. Gupta, M.S., D.O.M.S., Head of the department of Ophthalmology, M.L.B. Medical College, Jhansi, for his inspiring guidance, sustained encouragement and untiring help. His constructive criticism, constant impetus and unfathomable knowledge, have really been a great help to me. I am greatly beholden to him.

I am greatly indebted to record by feeling to Mr. B.D. Mathur, M.Sc., D.H.S., Reader in Statistics and Demography, Post Partum Programme, M.L.B. Medical College, Jhansi for his valuable guidance and keen interest in my work with his store of unlimited knowledge and excellence in expression, this work could be brought out in its present form.

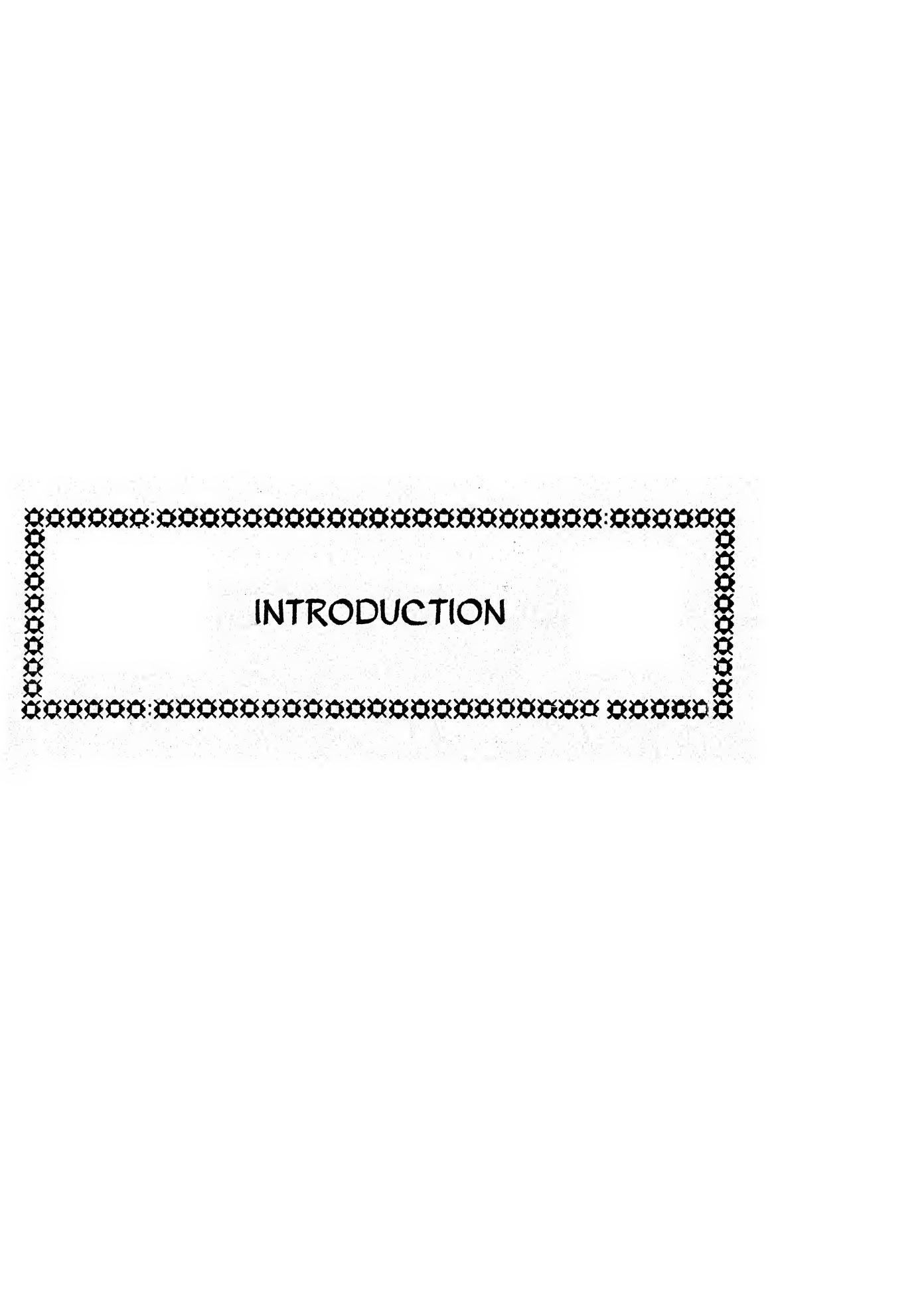
It gives me special pleasure to acknowledge the affection and love rendered by my parents & wife.

  
( LALJI )

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## INTRODUCTION

## INTRODUCTION

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Cataract refers to any opacity of the lens or its capsule, development of which not only causes diminution of vision but other ocular complications also even blindness, if it is left untreated. So, for preservation of good visual acuity and for the prevention of the associated complications, cataract has to be treated. And the only treatment for most of the cataract is its surgical removal.

The earliest surgical treatment, which is known as 'couching' began in India about 1000 BC. This procedure was performed for more than 2000 years until the mid-18th century, when its use declined, although even today it is still practised in rural India.

Great progress in cataract surgery has been made in recent years with the introduction of modern micro-surgical instruments & techniques such as - cryoextraction, microsurgery phacoemulsification and pars plana lensectomy. Cryoextraction is the method of choice for intracapsular lens extraction of all types of cataract while techniques for extracapsular lens extraction are liner extraction, aspiration pars plana lensectomy with vitrectomy and phacoemulsification. In extracapsular lens extraction the nucleus is usually mobilized and

expressed as in liner extraction technique, but before removal it can be fragmented inside the lens capsule with a microcutter or by ultrasonic emulsification as in aspiration, pars plana lensectomy and in phaco-emulsification techniques.

Surgical removal of the cataractus lens produces the aphakic condition of the eye. Aphakia (Greek ο = none, phacos = lens) means absence of the crystalline lens from the pupillary area and it refers to both anatomical as well as optical condition of the eye. The eye in this condition becomes extremely hypermetropic if it had been emmetropic or had only low grade of ametropia, before removal of the lens, as all accommodation is lost.

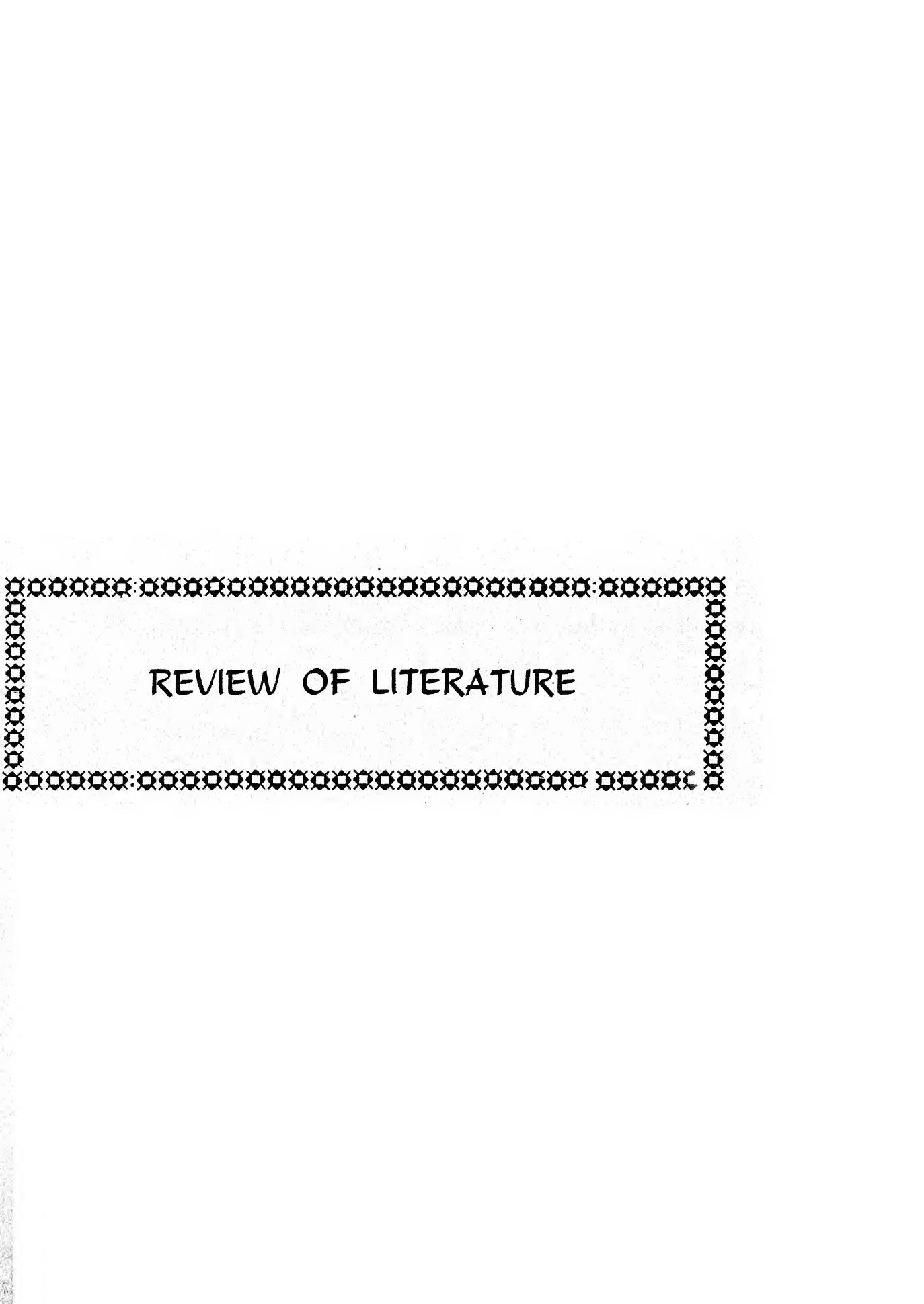
Aphakia is corrected by many methods. The traditional method of correction of aphakia is by simple glasses of appropriate number. But this method of correction has many disadvantages such as - there is about 25-30% magnification of the image, false distance orientation (objects appear near than they are) constriction of the visual field by the size of the lens, ring scotoma with "Jack in the box" phenomenon, binocular diplopia if other eye is having good vision, pincushion distortion of objects due to spherical aberration. In addition, the thick lenses make the glasses quite heavy, magnify the eyes and cosmetically unappealing.

Many of the above optical problems of the simple glasses may be overcome by prescribing contact lenses but they also have many disadvantages such as - there is magnification of the image by 7-9%; scarring of the cornea due to abrasion, infection, ulceration and neovascularisation; difficulty in using them especially by elderly patients and non-tolerance in dusty atmosphere. Moreover, they also require dexterity to insert and good hygiene to maintain them.

The recent and best method of the correction of the aphakia is intraocular artificial lens implantation. The different type of the intraocular lenses which are in common use are - anterior chamber lenses, iris supported lenses, capsule fixated lenses and posterior chamber lenses. Although almost all of the disadvantages of simple glasses and contact lenses are overcome by this method but intraocular lens implantation in anterior chamber as well as in posterior chamber is also carries many postoperative complications.

Though both the procedures (anterior chamber lens implantation & posterior chamber lens implantation) have their pros & cons. It appears that implantation in the posterior chamber might produce better results but it requires a complicated approach.

In the face of this, the present study is being designed to evaluate the postoperative complications of each procedure and to perform a comparative study of both of them.



## REVIEW OF LITERATURE

## REVIEW OF LITERATURE

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In the history of IOL, perhaps Tadini, an Ophthalmologist, was the first person who expressed the possibility of intra-ocular lens implantation during 18th century. And regarding this subject Cassanova (1766) had a meeting with him.

In about 1795 Cassamata performed a cataract operation and implanted an artificial lens inside the eye which was made up of glass. But he realised that glass lens could not be real substitute of the natural lens because the glass lens fell down into the bottom of the eye. Thus Cassamata was probably the 1st person to attempt an intraocular lens implantation for the correction of the aphakia.

However, the 1st successful posterior chamber IOL implant was done by Sir Harold Ridley on 29th November, 1947 at St. Thomas Hospital, London. The lens was made up of acrylic material and design was similar to the natural lens. And second was implanted on 23rd August, 1950. Ridley implanted about one thousand of his original IOLs and most of them were successful upto 1966. However, by the 1970 about 15% of his implants were removed. But

around 1959 Ridley ICL implantation were given up due to many postoperative complications like - sever iritis, pupillary oculusion by dense inflammatory membrane, late thickening and opacification of the post capsule, loss of anterior chamber, hyphaema, secondary glaucoma, iris atrophy from pressure by acrylic lens, decentring and dislocation of the lens. Decentring & dislocation were common because of the inadequate support of the fairly heavy IOL lenses. To overcome this problems Parry in 1954, attempted by anchoring the Ridley IOL by means of tentalum thread with the ends left loose beneath the conjunctiva. These Ridley lenses are described as - FIRST GENERATION of the ICL lenses.

Intraocular lens implantation into the anterior chamber were tried to overcome the complications and technical difficulties of the original Ridley lenses. And for their support & fixation the haptics or feet (rigid or elastic) of these lenses were propped against the scleral spur in the angle of the anterior chamber. These lenses were having many advantages such as they can be implanted following either intracapsular or extra-capsular lens extraction or as secondary implantation and with minimal dislocation of the lens. These anterior chamber lenses were described as SECOND GENERATION LENSES. First report about one such lens came from Strampelli in 1954.

Baron in 1982 performed the first anterior chamber lens implantation. The shape of this lens was like a curved disc facing forward to such an extent that it came into the contact of the endothelium leading to corneal decompensation.

Denheim in 1952 designed the first flexible closed loop type of anterior chamber. But this lens was failed due to hydrolytic biodegradation of the loops, which was made up of Nylon. This biogradation led to irritation in the eye, breakdown of loops and disintegration of the IOL with dislocation.

Barraquer in 1956 modified Denheim's closed loop into 'J' loop by cutting the half portion of the each closed loop. But biogradation of the nylon loop and occasional deep erosion into the angle recess were main complications.

Epstein & C.D. Binkhorst started the use of iris for the fixation of the intra-ocular lenses and these iris fixated lenses are the THIRD GENERATION of lens.

In 1953 Epstein implanted a collar button shaped lens. This lens was literally buttoned into the pupil and it was extending over both the front and back surface of the iris. But later on he gave up using this collar button

type of lens because of frequent development of secondary glaucoma and developed a new lens in the form of a cross under the name of Maltese Cross lens. In this lens where are four arms extending from the central optical portion, two of which were in front of the iris and two behind the iris. Since the plane of the arms and optical part is same so the iris wind around the lens like a basket weaving and although Epstein, after long time, abandoned this type of lens because of the high rate of inflammatory complications. But they are still available under the names of "COPELAND LENS" (after the name of the firm producing) or pupillary lens or iris plane lens because the optical part is in the plane of both the pupil and the iris. However, now they are not in routine practice because of the high incidence of chronic irritation and cystoid macular oedema especially after intracapsular lens extraction in comparison to the newer lenses. This led to on eventual abandonment of these lenses in favour of well designed modern anterior chamber & posterior chamber lenses.

A Binkhorst four loop lens was first implanted on 1st August, 1958. Basically, the iris clip lens by Binkhorst is a modified Denheim lens. Its anterior loops are not long enough to reach the angle of the chamber. Fixation is accomplished by attaching another pair of loops

to the body of the lens. These loops extend through the pupil behind the iris. The distance between anterior and posterior loop is large enough to avoid crushing of the iris. The weight of this lens is only about 1 mg in water. In comparison to its predecessors, the iris-clip implant has the following advantages - it has no contact with the chamber angle, so the structure of the angle can not be damaged. Secondary glaucoma from angle damage and haemorrhage from the angle unknown. Pupillary glaucoma, however, may occur if the peripheral iridectomy or iridotomies are not adequate. If the lens is properly made and implanted carefully, endothelial decompensation rarely develops. Measuring the anterior chamber diameter is not important. In addition to these, the lens and its exatly in the pupil, therefore, from the optical stand point, it is always well centered.

Since the original Binkhorst lens had a relatively large dislocation rate (11.5%), so in 1965 he increased the length of the anterior loops from 7.5 - 8.0 mm to 9.0 - 9.5 mm. This lens, however, led to more frequent contact with the corneal endothelium and to corneal damage. Therefore, in January, 1970, Binkhorst returned to the original lens diameter. However, occasional corneal endothelial-endothelial loop contact still occurred. To prevent this, since 1972, the loops of the Binkhorst lenses are backwards about 10 Degree.

In 1967, the shape of the optics has been changed from biconvex to planoconvex. This change simplifies the optical calculation and reduces the danger of pupillary block glaucoma.

And in 1972, the distance between the feet of the posterior loops was decreased, whereby the pupillary diameter was reduced, the depth preception increased, and the photophobia decreased.

Thus Binkhorst had four types of changes in his original lens -

- (i) Increased the length of the anterior loops from 7.5 - 8.0 to 9.0 - 9.5 mm;
- (ii) Changed the shape of optic from biconvex to planoconvex;
- (iii) Decreased the distance between the posterior loops;
- (iv) Tilted the loops of lens 10 degree backward.

It is in this form (diameter of the heptics, from zenith to zenith of the loops, of anterior loops is 7.5-8 mm and of posterior loops is 8.0 - 8.5 mm loops are tilted  $10^{\circ}$  backward, decreased distance between the posterior loops planoconvex optics and loops are made up of prolene) that the four - loop lenses are produced and still used.

But the problem of fixation is still existing and for this and to prevent dislocation miotics may be used post operatively until synechia develops between the pupillary margin and loop posteriorly. However, prolonged use of miotics increases the chances of developing C.M.L. and retinal detachment.

However, Binkhorst was not happy with the fixation of his lens. So for better fixation he fixes posterior loops into the capsule of the lens after doing ECLE. On 27th October, 1965, he demonstrated that this fixation was found to be so secure that pupil can be dilated adequately without any danger, miotics are not needed and even anterior loops were unnecessary. And he named these lenses, after their fixation pattern, as "iridocapsular" lens (Binkhorst two loop lens). The advantages of this type of lens are better fixation, rare chances of endothelial contact due to absence of anterior loop and decreased frequency & severity of the E.M.E. because of ECLE. Based on there observations Binkhorst considered the capsular fixation as the most advantageous fixation. These capsul fixed lenses are called as "FOURTH GENERATION LENSES".

However, such capsular fixation is not always accomplished. And recently he started using four-loop lens more frequently than before, after ECLE.

Modifications in iris clipped lenses by other scientists are as follows :

Fyodorov, (who introduced this lens first time in the Soviet Union in 1963) modified it by relating the anterior and posterior loops  $90^{\circ}$  to eachother. And these modified lenses are known as Fyodorov-I lens.

In 1968, Fyodorov and Zakarov introduced a lens with three posterior loops. And in order to make the lens lighter, they suppressed the anterior loops and inserted into the edge of the optical parts three antenna like extensions with rounded ends. These are known as sputnik lens or Fyodorov-II lens.

Fyodorov and Zakarov further modified the Fyodorov II lens by making it extremly light weight. This lens, although it continues with the six-point fixation of the previous lens, seems to cause no damage to the sphincter over the years.

Worst chose another way to fix an iris-clip lens to the iris. To get away from the miosis, in 1969 he began to tie the four-loop lens to the iris a suture. In 1970, Binkhorst and Worst employed a trans iridectomy

suture. But later on Worst developed a new design of lens with iris suture fixation mechanism.

The principle of medallion lens is of an iris clip lens; the posterior loops retained and their overall distance being 8.0 mm, while after loops are replaced by an acrylic plate the diameter of the plate is only 6.2mm. And there are two holes in this plate for passing the fixation suture. This lens was first implanted on 18th December, 1970 and fixed with nylon suture. But after many years it was found that nylon suture was not stable in the biologic environment i.e. it was biodegradable. So Worst substituted this nylon fixation suture by a metallic loop supplied with a safety pin like closing mechanism. The metals used were an alloy of platinum, iridium and titonium. Although initially metal loop lenses got very popularity but they produced many complications when used after ICLE and without additional fixation sutures. Because of increased weight, they cut through the sphincter. Uveitis of low grade also produced in some patient because of constant rubbing of the metal against the pigment which causes increase in the incidence of the retinal detachment. Now these lenses are not available.

In the research of the permanent non-absorbing and non-biodegradable fixation sutures, Worst has used "Steel suture" after slightly modifying the Medallian lens (known as slotted medallian lens; Worst, 1976). Rechner (1978, 1983) used "Prolene suture" for the fixation of the Medallian lens.

Worst in 1978 developed another mechanism for fixation. He clipped a single plane lens to the iris by a claw mechanism of the lens edges themselves. This can be used as prepupillary or posterior chamber lens following ECLE or ICLE, as primary or secondary implant.

Although posterior chamber (capsular bag; after ECLE) lens implantation first performed by the Ridley in 1949. But it was Pearce who reinstated the posterior chamber lens. In 1970, he removed the posterior loops of a Binkhorst four-loop lens. He placed this monoplane lens retroiridially after ECLE and sutured the superior loop to the superior anterior capsular flap and to the iris. In 1976, he designed a new model of posterior chamber lens which was based on the Ridley anterior model, by creating a rigid tripod configuration. He placed this lens into the capsular bag below, and often above, but occasionally suturing the superior foot to the iris.

Simcoe in 1977 reported that he was using an open loop posterior chamber lens by removing the posterior loops of a Binkhorst four loop lens and cutting the loops following ECLE, he sutured this lens to the iris.

However, well acceptance & appreciation of posterior chamber lenses came in 1977 when Shearing introduced a lens model which was based on the Berraquer flaxible open loop (J-loop) principle with a new concept of fixation. Whereas, Berraquer placed his lens into the anterior chamber, fixing it to the angle of anterior chamber, Shearing placed it into the posterior chamber after ECLE and fixed it by incarceration of its haptics into the ciliary sulcus or iridocitior sulcus or posterior chamber angle. This type of Shearing lens found increasing acceptance and with some modifications in it by Kratz (1978), Lindstrom et al (1981). Sinskey (1981) and Jacobi (1982) it has become one of the most widely used lenses in many countries. Other posterior chamber models are inserted into the capsular bag partially (for example - pource & Hanis lenses) or totally (for example - Anis, Ong, Galland and Sheets lenses) into the capsular bag.

Posterior chamber lenses (Retroiridial lenses) are distinguished from the iris clip lenses by the following features -  
Completely in the posterior chamber

- (i) The pupil can be widely dilated. This permits better treatment of iritis and better inspection & treatment of retinal diseases;
- (ii) There are less chances of endothelial contant with lens since it has no any part in the anterior chamber, so these lenses can be implanted safely and easily in eyes of glaucoma who later on may need filtering operation or penetrating keroplasty;
- (iii) Less aniseikonia because lens sits in the optical centre of the eye; and
- (iv) They are single plane lenses so they are less bulky & less damaging to the tissue during & after implantation and they have less contact with iris than the multiplane lenses.

The Binkhorst posterior chamber lenses introduced important concepts. One of his lenses is a modified four loop lens with shorter anterior loops than before. It is implanted as an iris-clip lens. It is kept in its iris-clip position for about 4 days, during which time secure capsular fixation occurs, and the lens is perfectly well centred. The pupil is then vigorously dilated, and the lens is allowed to slip behind the iris, placed now completely in the posterior chamber.

Since 1975 to the present information from the extensive clinical experience with IOL during the past decade has contributed to a rapid and highly innovative era of IOL development of utmost importance has been increasing use of ECCE and posterior chamber implantation. Numerous modern well designed anterior chamber IOL have been introduced. There has been continuous improvement in lens design and in IOL manufacturing techniques are more refined and are safer. This is the era where modern IOL styles. This era has also been the transition from nylon to polypropylene and PMMA as loop material.

Lens implantation intensified the interest in the corneal endothelium. New methods of examination (such as specular microscopy, pachymetry & scanning electron microscopy) are constantly expanding our knowledge of the physiologic, physical and chemical properties and role of the endothelium. New ways are being sought to protect the cells by using safer material (different plastics, glass, silicone etc.) which are less toxic and dangerous to the endothelium than PMMA, by coating existing lenses with substances such as methyl cellulose, sodium hyaluronate (Healon), chondroitin sulfate and serum. Ultraviolet rays filtering dyes are added to the lens to protect the macula from harmful radiation.

Table - 1  
**Evolution of intraocular lenses**

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**Generation - I (1949-54) : Original Ridley posterior chamber.**

1. Ridley 1949
  2. Parry (Implantation modification, 1954)
- 

**Generation - II (Ca 1952-62) : Development of Anterior chamber lenses.**

1. Rigid or Semirigid -
    - Baron 1952, 1954
    - Scharf, 1953
    - Strampelli tripod, 1953
    - Schreck, 1954
    - Bietti, 1955
    - Choyce Mark I, 1956
    - Ridley Mark I and II, 1957, 1960
    - Boberg - Ans, 1961
  2. Flexible or Semiflexible loops -
    - a. Closed loops
      - Dannheim, 1952
      - Strampelli, 1956
      - Lieb and Guerry, 1957
    - b. Open loops
      - Barraquer, J loop, 1956
-

Generation-III (Ca 1953-70) : Continued development of anterior chamber lenses & introduction of iris supported lenses

Anterior Chamber:

1. Rigid or Semirigid

Choyce Mark II, 1957 to Choyce Mark - VIII, 1963.

2. Flexible

Iris supported

Epstein "Collar stud lens, 1953

Binkhorst iris clip 1957, 1958

Epstein maltese cross (Evolved into copeland Binkhorst lens) ,1962

Fyedorov type I iris clip, 1964

Binkhorst iridocapsular, 1965

Fyodorov V type II sputnik iris clip, 1968

Worst Medallion iridocapsular, early, 1970

Worst Platina early, 1970s

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Generation - IV (Ca 1975 to present) : Major improvement in microsurgical techniques, lens designs and lens materials introduction of posterior chamber lens.

Anterior chamber lenses

1. Rigid or Semirigid

Azar Mark - II, 1977

Tennant Anchor, 1974

2. Flexible or Semiflexible loops or foot plates

a. Closed loops

Leiske, 1978

Hessburg, 1981

Optiflex, 1981

Azar 91Z 1982

Stable flex, 1983

b. Open loops or foot plates

Kelman II 3-point fixation 1978

Kelman Quadriflex, 1981

Kelman Omnipify, 1981

Kelman Multiflex, 1982

c. Radial loops

Copeland, 1982

Based on various studies the complications early and late following IOL implantation (anterior and posterior) chamber were - iritis, keratitis, corneal oedema, dislocation of lens, secondary glaucoma, hyphaema, macular oedema, retinal detachment, vitritis, cyclitic membrane pupillary block, endophthalmitis etc.

The incidence of cystoid macular oedema and corneal decompensation was highest in cases of anterior chamber IOL while posterior capsular opacification was the main late complication following posterior chamber IOL. Further retinal detachment was the main complication of the simple cataract extraction.

J. Watts (1979-1983) carried out a retrospective comparison of lens implant surgery and cataract surgery. In lens implant surgery he also studied the percentage of complications in anterior chamber and posterior chamber IOL.

- Complications following anterior chamber IOL implant surgery were in 14% cases.
- Complications following posterior chamber IOL implant surgery were in 7% cases.
- Complications following routine cataract surgery were in 4% cases.

S. Tony Fernandez and Sebastin Pious, Angamally studied about 412 cases of anterior chamber IOL implant in their followup. The age of the patients at the time of cataract surgery ranged from 20 years to 78 years. 6/9 vision is regained in about 37% cases while 6/18 vision was regained in about 80% cases. The cystoid macular oedema and corneal decompensation was found to be main complications, the details of complications and their percentage are given as below :

#### COMPLICATIONS IN ANTERIOR CHAMBER IOL :

##### A. Immediate Post Operative

1. Iritis in 81 cases =  $81 \times 100/412 = 20\%$
2. Hyphaema in 26 cases =  $26 \times 100/412 = 6.4\%$
3. Iris Tucking in 11 cases =  $11 \times 100/412 = 2.75\%$
4. Secondary glaucoma in 9 cases =  $9 \times 100/412 = 2.25\%$

##### B. Late complications

1. Chronic iritis in 16 cases =  $16 \times 100/412 = 4\%$
2. Dislocation of the lens in 2 cases =  $2 \times 100/412 = 0.5\%$
3. U.G.H. syndrome in 11 cases =  $11 \times 100/412 = 2.75\%$
4. Chronic iritis in 19 cases =  $19 \times 100/412 = 4.75\%$
5. Cystoid macular oedema in 29 cases =  $29 \times 100/412 = 7.25\%$
6. Corneal decompensation in 32 cases =  $32 \times 100/412 = 8\%$

Post Operative Visual Acuity :

1. 6/6 - 6/9 in 152 cases =  $152 \times 100/412 = 37\%$
2. 6/12- 6/18 in 163 cases =  $163 \times 100/412 = 40\%$
3. 6/24- 6/60 in 54 cases =  $54 \times 100/412 = 13\%$
4. 6/60 in 43 cases =  $43 \times 100/412 = 10\%$

S. Tony Fernandez and E.J. Mani Angamally studied 100 cases of intra-ocular lens implantation in capsular bag and the patients selected were of uncomplicated cataracts in which senile cataracts were 60 cases and cataracts in young patients (congenital and traumatic) were 40. These complications are given as below :

Complications

1. Striate keratitis in 50 cases =  $50 \times 100/100 = 50\%$
2. Hyphaema in 4 cases =  $4 \times 100/100 = 4\%$
3. Iritis in 6 cases =  $6 \times 100/100 = 6\%$
4. Opacity of anterior capsule in 12 cases =  $12 \times 100/100 = 12\%$
5. Opacity of posterior capsule in 24 cases =  $24 \times 100/100 = 24\%$

Post Operative Visual Improvement :

- |                         |                              |
|-------------------------|------------------------------|
| 6/6 in 16 cases         | = $16 \times 100/100 = 16\%$ |
| 6/9 to 6/18 in 82 cases | = $82 \times 100/100 = 82\%$ |
| <u>6/60</u> in 2 cases  | = $2 \times 100/100 = 2\%$   |

Sudhakar J, Ravindran RD and Natichiar G, studied 1000 cases of primary posterior chamber lens implantation during a period of one year, the cases included uncomplicated as those with various associated conditions like, diabetes, traumatic cataract, complicated cataracts, myopia, developments cataracts. The posterior capsular opacification was found to be main complication and treated by YAG later capsulotomy and the vision was 6/9 - 6/12 in more than 80% cases. The details of complications are given as below :

COMPLICATIONS IN POSTERIOR CHAMBER IOL :

A. Early complications :

1. Striate keratitis in 73 cases =  $73 \times 100/1000 = 7.3\%$
2. Corneal oedema in 17 cases =  $17 \times 100/1000 = 1.7\%$
3. Iritis in 48 cases =  $48 \times 100/1000 = 4.8\%$
4. Endophthalmitis in 5 cases =  $5 \times 100/1000 = 0.5\%$

B. Late complications :

1. Posterior capsular opacification in 115/1000 =  $11.5\%$
2. Persistent uveitis in 42/1000 cases =  $4.2\%$
3. Cystoid macular oedema in 3/1000 cases =  $0.3\%$

Early or late complications :

- Mal position of IOL in 20/1000 cases =  $2.8\%$

POST OPERATIVE VISUAL ACUITY :

Sl. No.	Vision with correction	No.of cases	Percentage
1.	6/6 - 6/9	571 = $571 \times 100/1000 = 57.1\%$	
2.	6/12 - 6/18	315 = $315 \times 100/1000 = 31.5\%$	
3.	6/24 - 6/60	62 = $62 \times 100/1000 = 6.2\%$	
4.	<u>6/60</u>	22 = $22 \times 100/1000 = 2.2\%$	
5.	No follow up	30 = $30 \times 100/1000 = 3.0\%$	

Thus about  $\overline{7}$  80% cases of posterior chamber IOL had 6/6 - 6/12 vision.

Subhash P. Kadam, Baroda (1989) studied complications during and after IOL (anterior chamber as well as posterior chamber) surgery in 225 cases of which 149 cases were of anterior chamber IOL and 79 cases were of posterior chamber IOL. These are given below :

**Complications in anterior chamber IOL (149 cases):**

Sl. No.	Complications	No.of cases	Percentage
1.	Iritis	17	11.34
2.	Striate Keratitis	8	05.37
3.	Endophthalmitis	1	00.67
4.	Hyphaema	3	02.00
5.	U.G.H. Syndrome	Nil	00.00
6.	Tucking of iris	6	04.03
7.	Glaucoma	4	02.68
8.	Tremulous implant	2	01.34
9.	Internal iris prolapse	4	02.68
10.	Ciliary tenderness	Nil	00.00
11.	Retinal detachment	Nil	00.00
12.	Macular oedema	6	04.03

**Complications (early or late) in posterior chamber IOL (79 cases)**

Sl. No.	Complications	No.of cases	Percentage
1.	Hyphaema	8	10.28
2.	Striate keratitis	10	12.6
3.	Lens displaced in anterior chamber loop remains in posterior chamber	2	02.52
4.	Post-capsular thickening	12	15.12
5.	Iritis	6	07.56
6.	Decentring of lens	1	01.26
7.	Macular oedema	3	03.78

In his study he found that the complications of posterior chamber IOL are less than the anterior chamber IOL and the main late complications of posterior chamber IOL was posterior capsular opacification while CME was main late complication in anterior chamber IOL.

### VARIOUS TYPES OF MODERN ANTERIOR CHAMBER LENSES :

On the basis of the compressibility of the haptics, four types of anterior chamber lenses are available, which are as follows :

#### 1. Rigid type :

- (i) Choyce Mark VIII lens
- (ii) Choyce Tennant lens
- (iii) Choyce Mark IX lens
- (iv) Azar-Pyramid - I

#### 2. Semirigid Type :

- (i) Tennent Anchor lens
- (ii) Kelman "Pregnant 7" lens
- (iii) Azar Pyramid II lens
- (iv) Leiske lens
- (v) Hessburg lens

#### 3. Flexible type :

- (i) Kelman Quadriflex type lens
- (ii) Dubroff lens
- (iii) Shepard universal lens
- (iv) Pannu lens
- (v) Soft-S-lens
- (vi) Stableflex lens

#### 4. Mixed type :

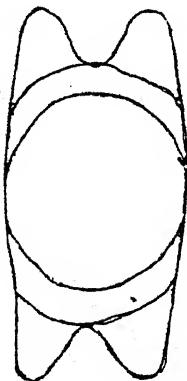
- (i) Tennent Anchor flex lens

MODERN ANTERIOR CHAMBER ANGLE FIXATED  
INTRAOCULAR LENSES

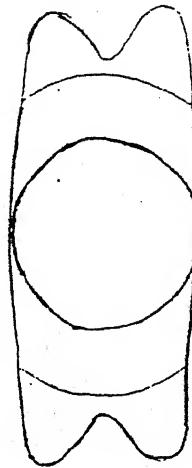
FOUR TYPES:

1 : rigid (R) 2 semirigid (S) 3 flexible (F) 4 mixed (M)

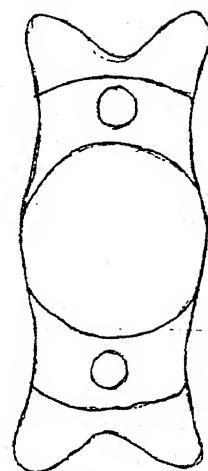
(1) RIGID TYPE (R) :



CHOYCE MARK VIII  
LENS (R)

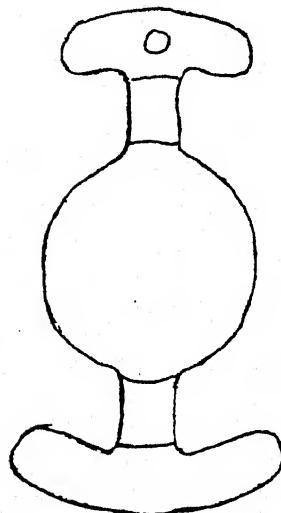


CHOYCE TENNANT  
LENS (R)

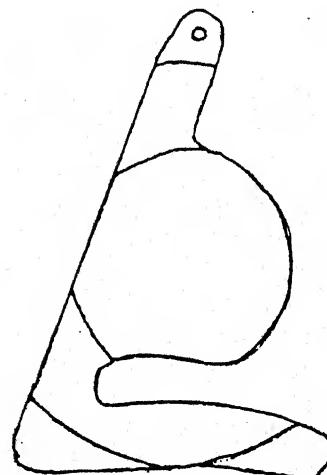


CHOYCE MARK IX AZAR-PYRF  
I - LENZ (R)

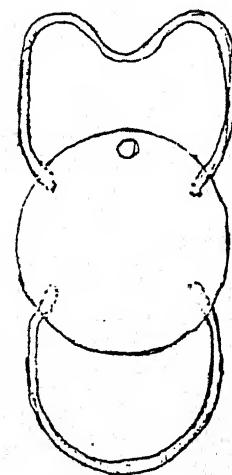
(2) SEMIRIGID TYPE (S) :



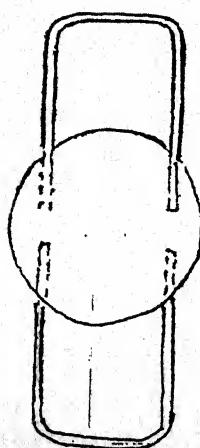
TENNANT ANCHOR  
LENS (S)



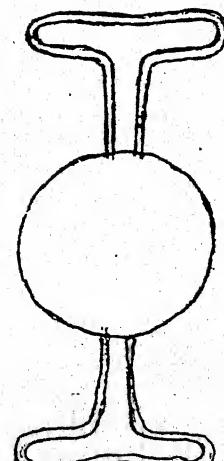
KELMAN "PREGNANT 7"  
LENS (S)



AZAR PYRAMID II  
LENS (S)

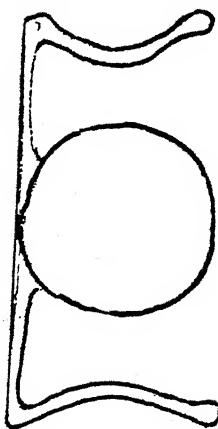


LEISKE LENS (S)

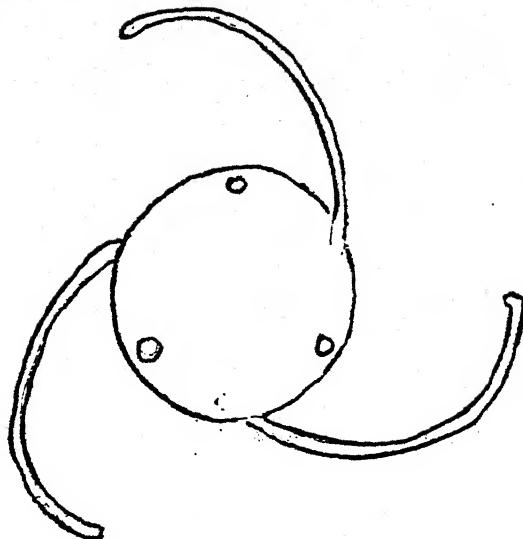


HESSBURG LENS (S)

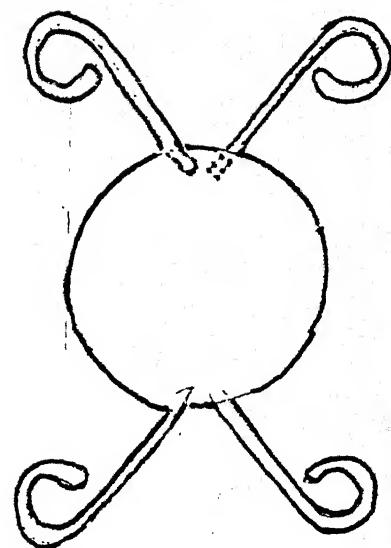
(3) FLEXIBLE TYPE (F)



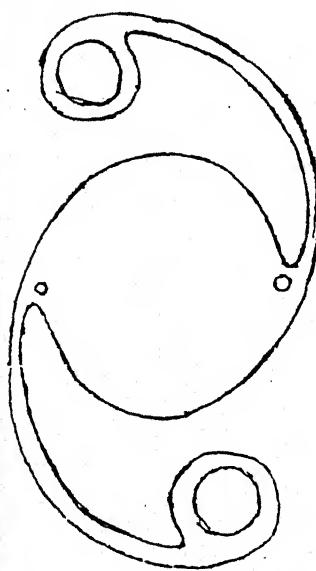
KELMAN QUADRIFLUX LENS(F)



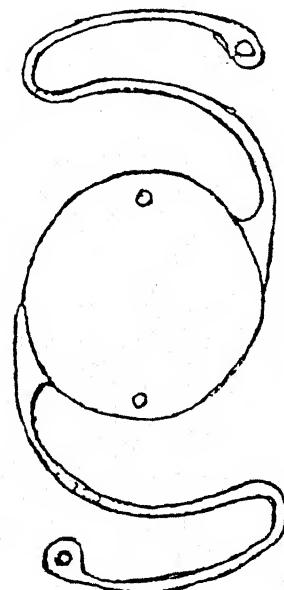
DUBROFF LENS(F)



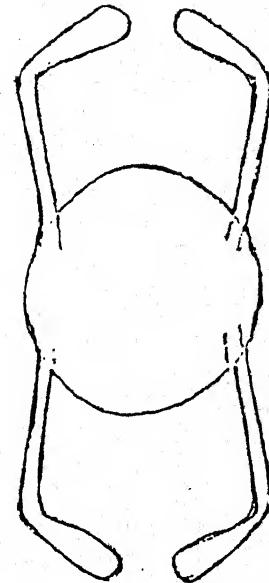
SHEOPARD UNIVERS  
LENS(F)



PANNU LENS(F)

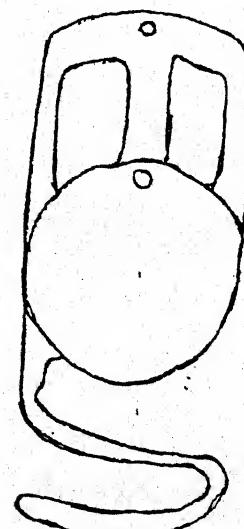


SOFT-S-LENS(F)



STABLEFLEX LENS(F)

(4) MIXED TYPE (M)



TENNANT ANCHOR  
FLEX LENS(M)

VARIOUS TYPES OF MODERN POSTERIOR CHAMBER (RETRO-PUPILLARY OR RETROIRIDIAL) LENSES:

Lenses whose optic is in the posterior chamber, irrespective of their fixation mechanism whether it is iridociliary sulcus fixated or capsule fixated or iris clip fixated type, are known as posterior chamber lenses.

On the basis of the configuration of the lenses, the posterior chamber lenses are divided into two types:

1. Single plane lenses :

Lenses in which optical parts and supporting elements are in the same plane are known as single plane lenses on the basis of their fixation mechanism they are of 2 types :

(A) Iridociliary sulcus fixated type of lenses :  
Flexible type :

- (i) Shearing J-loop lens
- (ii) Simcoe C-loop lens
- (iii) Sinsky - Kratz J-loop lens
- (iv) Pannu lens
- (v) Ebs-Fenzl-Osher lens
- (vi) Lynell J-loop lens
- (vii) Lester type J-loop lens
- (viii) 3M 348 lens
- (ix) Shepard universal lens

(B) Capsule fixated lenses : two types-

(a) Rigid type :

- (i) Pearce lens
- (ii) Harris Arnot lens

(b) Flexible type :

- (i) Anis lens
- (ii) Galand lens
- (iii) Ong lens
- (iv) Sheets lens
- (v) J-loop lens for capsular fixation
- (vi) Harris II lens

## 2. Two plane Retropupillary lenses :

Lenses in which the supporting elements are not in the same plane as the optical part of the lens, but the supporting elements are distinctly separated from it by ports.

On the basis of their fixation mechanism they are of two types :-

### (A) Iridociliary sulcus fixated type of lenses : Flexible type :

- (i) Faulkner lens
- (ii) Rainin lens

### (B) Iris-clip fixated lenses : two types -

#### (a) Semirigid type :

- (i) Severin lens

#### (b) Mixed type :

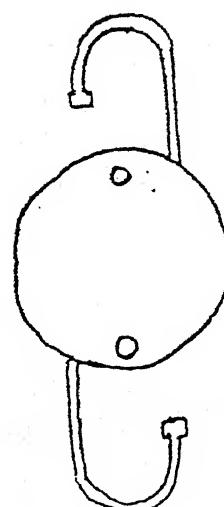
- (i) Boberg - Ans lens
- (ii) Litte-Arnot lens

POSTERIOR CHAMBER LENSES

1. Single Plane lenses :

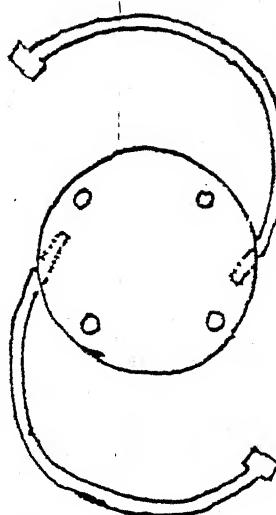
(A) Iridociliary sulcus fixated type of lenses: Flexible type:

(i) Shearing J-loop lens



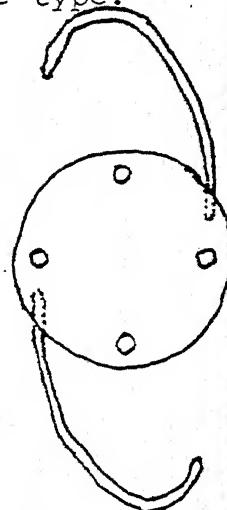
(i)

(ii) Simcoe C-loop lens



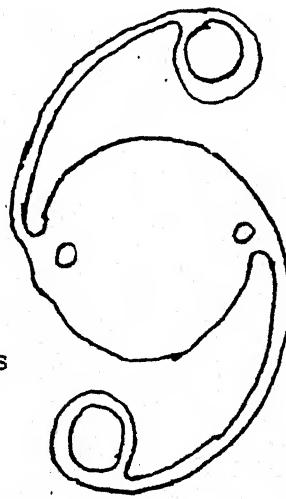
(ii)

(iii) Sinsky-Kratz J-loop lens



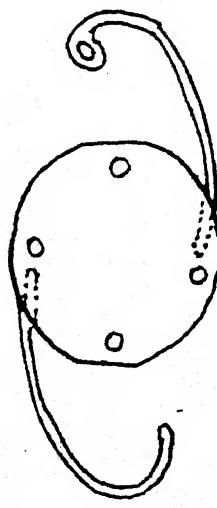
(iii)

(iv) Pannu lens



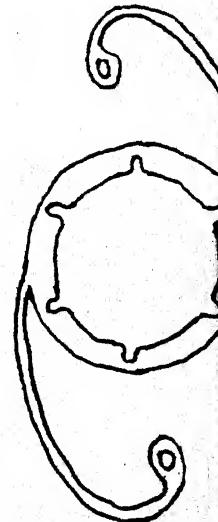
(iv)

(v) Ebs-Fenzl-Osher lens



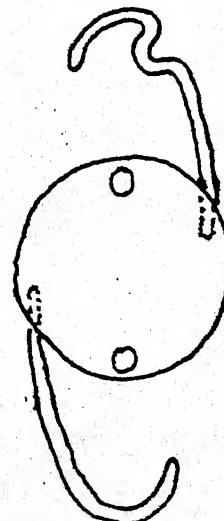
(v)

(vi) Lynell J-loop lens



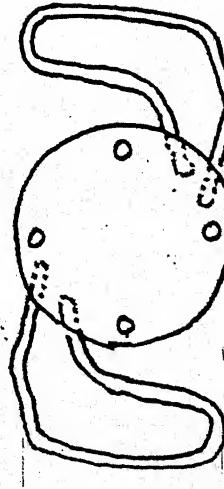
(vi)

(vii) Lester type J-loop lens



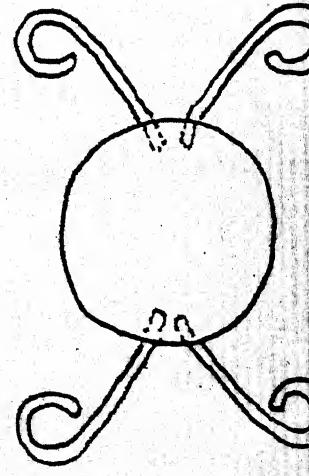
(vii)

(viii) 3M 34S lens



(viii)

(ix) Shepard universal lens

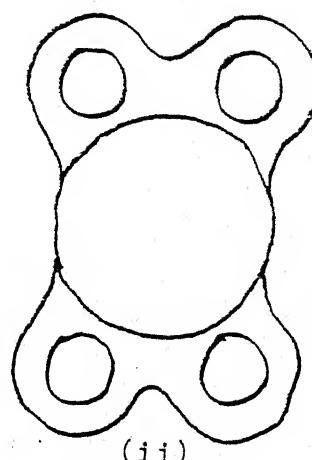
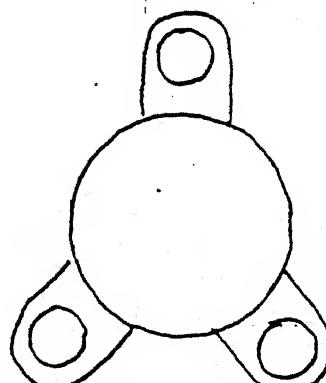


(ix)

(B) Capsule fixated single plane Retropupillary lenses : Two types :

(a) Rigid type :

(i) Pearce lens

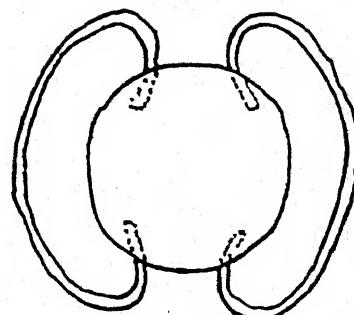


(i)

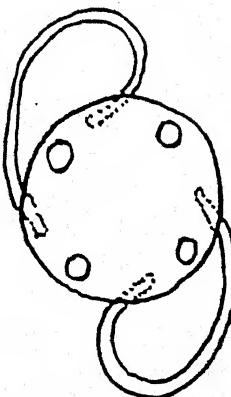
(ii)

(b) Flexible type :

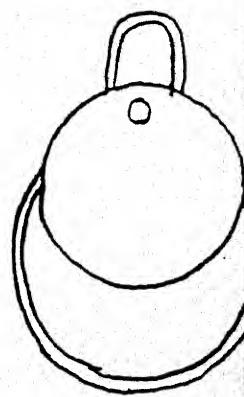
(i) Anis lens



(i)

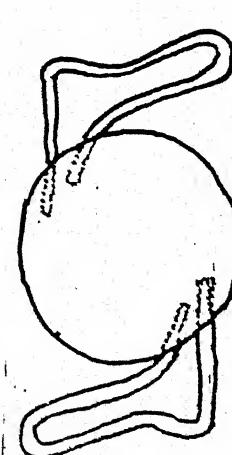


(ii)



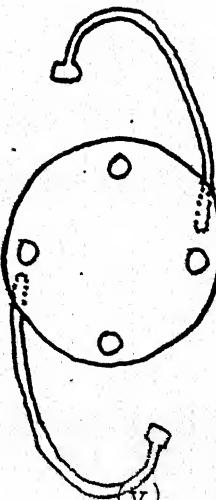
(iii)

(iv) Sheets lens



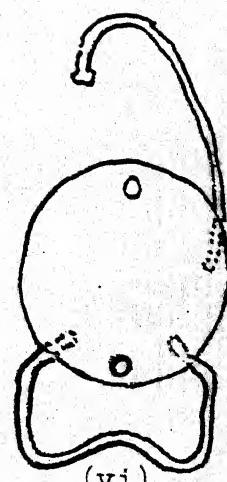
(iv)

(v) J-loop lens for capsular fixation



(v)

(vi) Harris II lens

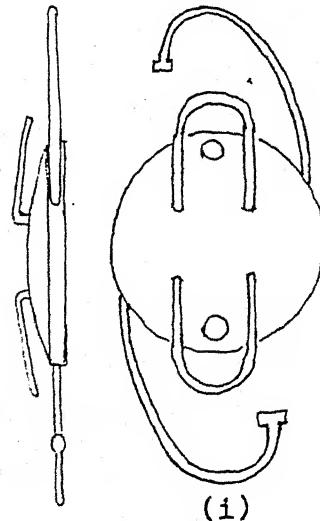


(vi)

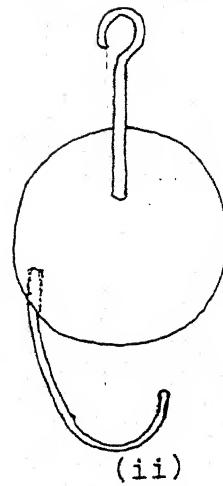
2. Two plane Retropupillary lenses : Two types :

(A) Iridociliary sulcus fixated type of lenses :  
Flexible type :

(i) Faulkner lens



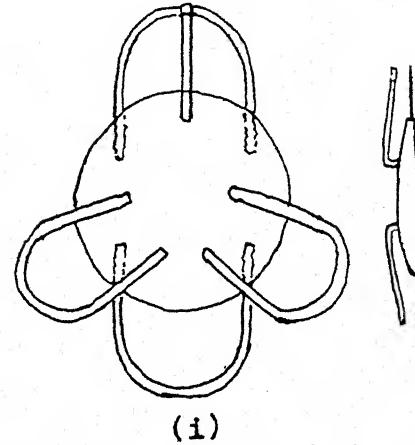
(ii) Rainin lens



(B) Iris-clip fixated lenses : two types :

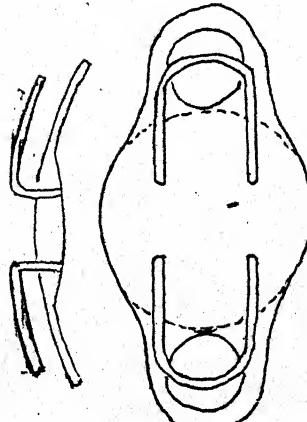
(a) Semirigid type :

(i) Severin lens

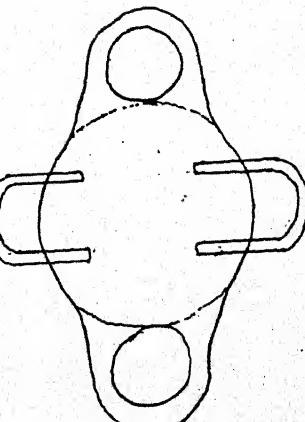


(b) Mixed type :

(i) Boberg-Ans lens

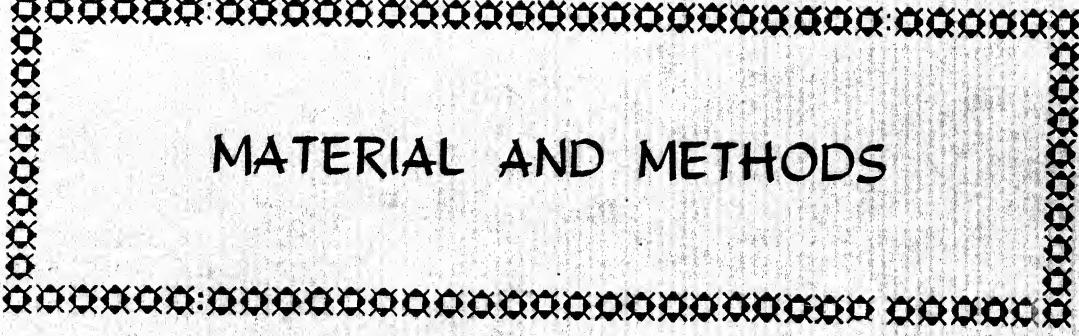


(ii) Litte-Arnott lens



AIMS OF STUDY :

1. To compare the postoperative complications in anterior chamber lens implantation and in posterior chamber lens implantation.
2. To assess the postoperative final visual acuity in anterior chamber lens implanted cases as well as in posterior chamber lens implanted cases.
3. To find out which method, out of the two (anterior chamber lens implantation and posterior chamber lens implantation), is superior for the correction of aphakia.
4. To evaluate practical feasibility of both the methods.



## MATERIAL AND METHODS

#### MATERIAL & METHODS

---

Patients of cataract attending O.P.D. of the Department of Ophthalmology, Maharani Laxmi Bai Medical College Hospital, Jhansi were selected for the study and divided into two groups (Group 'A' & 'B'). In Group 'A' anterior chamber lenses were implanted and in Group 'B' posterior chamber lenses were implanted. Group 'A' was consisting of 30 patients among which 24 had mature cataract, 5 had submature cataract of senile type and one case was of traumatic cataract in a young patient of 16 years.

A thorough preoperative general, systemic (Hypertension, Diabetes mellitus, Asthma, Thyroid diseases cerebrovascular insufficiency) and local examination and routine investigations were carried out.

The patient having uniocular eye, complicated cataract, diabetes mellitus, retinal detachment or H/o retinal detachment, corneal dystrophy, keratitis, corneal opacity, chronic glaucoma which was not controlled with medical treatment, high myopia, patient of bleeding disorder were excluded from the present study.

The preoperative refractory condition of the eye was determined with the help of history & retinoscopy and IOL of appropriate number were placed in the anterior and posterior chamber.

Primary Refractory Method :

A detailed past history regarding refractory condition of the patient was taken and the number of the glasses used were noted. And retinoscopy was done in those patients in which glow was formed.

Power of the POL is calculated by the formula given below :

For Group 'A' :

$$\text{Formula} = 18 + (\text{PRE} \times 1.25)$$

PRE = Primary refractive Error

For Group 'B' :

$$\text{Power of P.C. Lens} = 20 + (\text{PRE} \times 1.25)$$

PRE = Primary Refractive Error

Selection of IOL Lenses :(a) For Group 'A' :

Universal Mark N A.C. lens with a 5.50 mm UV absorbing optic

No holes

Two PMMA Loops

Length = 11.50 - 13.50 mm

and five spherichaptic suturing loops with an intraocular suture unit.

(b) For Group 'B' :

Modified 'J' loop P.C. lens with a 6.0 mm UV absorbing optic

Two positioning holes

Two PMMA Loops, 10° Angulation

Length = 14.0 mm

Pre-operative preparations :

Antibiotic drops (Chloromycetin) were instilled into the eye to treat any possible local infection, atleast one or two days in advance. Xylocaine sensitivity had been done. Part was prepared. Night before the operation Tabs. Diazepam (5mg), Tabs Diamox (500mg) and Tabs dulcolax were given.

Drocyn 10% (Phenylephrine) eye drops and cadiflur (Flurbiprofen) eye drops were instilled into the eye for the proper dilatation of the pupil, 2 hours before the operation. Inj. Mannitol 200 mg (20%) (about 0.3 mg/Kg body weight) was given intravenously 30 minutes before the operation.

Anaesthesia :

For Topical anaesthesia 4% lignocaine was instilled into the eye while for facial block (O'brien's technique) and for retrobulbar injection 2% lignocaine with 1:1000,00 adrenaline was used.

OPERATION :

After draping the part, lid sutures (upper & lower) were given then S.R. suture was given and fixed. Limbus based conjunctival flap was made and vessels were cauterized. Limbal section was made from 9 o'clock to 3 o'clock position. One preplaced suture passed at 12 o'clock position, peripheral iridectomy was done. ICCE was performed with cryo method. And for ECCE after making section Nucleus expressed and chamber was irrigated in closed chamber technique.

Now one or two stitches were removed and vigilon was introduced into the anterior chamber, followed by placement of the lens in the anterior chamber as well as in the posterior chamber then the section was closed with the help of 8 = 0 monofilament suture by giving 6-7 stitches. After this, post operative complications were looked for.

POST OPERATIVE CARE :

All the patient were given Tabs Septron 2 BD, Tabs Brufen 400 mg 1 TDS, Tabs Vit 'C' 500 mg IOD, Tabs BC 1 BD and daily dressing with Neosporin-H eye ointment for 7 days & complications were noted.

After 7 days patient was discharged from the hospital. And then follow up was done weekly for one month and stitches were removed. After this follow up done at 15 days interval for 2 month then at monthly interval in the O.P.D. for the 6-8 month and during this period of every check up complications were noted.

The examination was carried out as per proforma with the help of diffuse illumination, slit lamp, gonioscopy, direct and indirect ophthalmoscopy, retinoscopy and visual acuity was noted. Tryglass and tonometry was done in relevant cases.



## OBSERVATIONS

## OBSERVATIONS

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In the present study 30 patients have been selected for the anterior chamber lens implantation and they were grouped as group 'A', and 15 patients for the posterior chamber lens implantation and grouped as group 'B'.

The patients were admitted in the department of Ophthalmology, Maharani Laxmi Bai Medical College & Hospital, Jhansi; cataract operation performed and lenses were implanted in the group 'A' as well as in the group 'B' patients.

Following lens implantation early & late post-operative complications have been studied in both the groups from the operative period to the postoperative period i.e. from 6 to 12 months. Finally the complications & visual acuity in both the groups were compared.

In the group 'A' most of cases were of mature cataract of senile type among which 24 cases were of mature cataract, 5 cases were submature and one case was traumatic cataract.

While in group 'B', all the 15 cases were of mature cataract of senile type.

Cases for Group 'A' :

The details of the cases selected in Group 'A' are given below in the table no. 1 and 2.

Table - 1

Showing details of the cases selected for Group 'A' cases

Sl. No.	Type of cataract in the eye to be operated in Group 'A'	Cases No.	%
1.	Mature cataract	20	66.67
2.	Submature cataract	09	30.00
3.	Traumatic cataract	01	03.33
Total		30	100.00

Table - 2  
Showing the age & sex distribution of group 'A' patients

Sl. No.	Age group	Sex				Total cases No.	Percentage
		Male No.	%	Female No.	%		
1.	00 - 10	-	-	-	-	-	-
2.	11 - 20	01	03.33	-	-	01	03.33
3.	21 - 30	-	-	-	-	-	-
4.	31 - 40	-	-	-	-	-	-
5.	41 - 50	04	13.33	02	06.66	06	20.00
6.	51 - 60	10	33.33	06	20.00	16	53.33
7.	61 - 70	05	16.67	02	06.66	07	23.33
8.	71 - 80	-	-	-	-	-	-
<b>Total</b>		<b>20</b>	<b>66.67</b>	<b>10</b>	<b>33.33</b>	<b>30</b>	<b>100.00</b>

As shown in the table most of the cases were males. The youngest patient was 16 years old and eldest was 70 years old. Out of the 30 patients 20 were males and 10 were females.

Early Post-operative complications in Group 'A' cases :

Complications during post-operative period (early and late) which were found in the cases are given below in the table no. 3 & 4.

Table - 3

Showing Early Postoperative complications in  
Group 'A' cases

Sl. No.	Complications	No.	Percentage
1.	Striate keratitis	11	36.67
2.	Corneal oedema	03	10.00
3.	Shallow anterior chamber	02	06.67
4.	Iritis	08	26.67
5.	Hyphaema	02	06.67
6.	Secondary glaucoma	02	06.67
7.	Distortion of pupil	01	03.33
8.	Incarceration of Haptic into the wound	01	03.33

As shown in the above table the most common complication during early postoperative period was striate keratitis which was present in 11 cases (36.67%), but in most of the cases it disappeared within a period of 4-7 days except in 3 cases in which it was persisting even after 7 days. Out of these three, in 2 cases it disappeared in about 13-15 days, while in one case it took about 18 days to disappear. But finally striate keratitis disappeared in all the 11 cases.

Corneal oedema was present in 3 cases but cornea became clear within a week. Distortion of the pupil was present in one case.

Shallow anterior chamber was found in 2 cases for this daily pressure bandage and tabs. Diomox 1 BD were given for 4 days and anterior chamber became normal during this period.

During early post-operative period iritis was observed in about 26.67% cases (6 cases). These cases were treated by giving daily subconjunctival inj. Decadron 1/4 ml, Inj Atropine 1/4 ml and Inj Gentamicin 1/4 ml; and Topical cortico-steroid drops & cycloplegics alongwith systemic corticosteroids and anti-inflammatory. By this treatment iritis disappeared within 18-22 days in 5 cases while in one case it was persisting for about 7-8 weeks, which also subsided with the treatment.

Hyphaema was present in 3 cases (10%), but disappeared within 4-6 days in all cases.

Raised intraocular tension was observed in 2 cases which disappeared after treatment with Tabs. diamox 1 BD and anti-inflammatory drugs.

In one case one haptic of the lens got incarcerated into the wound at 2 o'clock position. For this patient was shifted again to the O.T. and stitches were removed & haptic was placed at its proper place in the anterior chamber and then proper resuturing of the wound was done.

Late Postoperative complications in Group 'A' cases :

The late postoperative complications observed in group 'A' cases are given below in the table - 4.

Table - 4  
Showing late postoperative complications in  
Group 'A' cases

Sl. No.	Complications	No.	Percentage
1.	Persistent iritis	4	13.32
2.	Flashing of the light	2	06.67
3.	Cystoid macular oedema	2	06.67
4.	Dislocation of the lens	1	03.33

In about 13% cases the iritis was observed even after many weeks of postoperative period, and it was associated with raised intraocular pressure. It was treated with the help of subconjunctival injections of Decadron and atropine. Topical corticosteroid & indomethacin drops were also instilled. Systemic anti-inflammatory tabs Brufen 400 mg 1 TDS and tabs Prednisolone (5mg) 2 TDS were given and with the above treatment, it subsided in about 2 months.

Dislocation of the implanted lens into the vitreous was observed in one case (3.33%) only. In this case the cataract surgery performed was of intracapsular type. And the probable causes of this were larger size iridectomy which got incidently performed at the time of surgery and dilatation of the pupil. It was left as such and follow up was done for many months but there was no any other obvious ocular complications and vision achieved after correction with glasses was 6/24.

Cystoid macular oedema was observed in 2 cases. In these cases intracapsular cataract extraction was performed. It was treated with the help of topical indomethacin instillation and topical corticosteroid drops, instillation and systemic tabs diclofenac (100mg) daily. And this disappeared in about 4 months.

Flashing of the light was present in 6.67 cases. Initially it was more but subsequently it subsided to some extent and patient also adapted to this condition. And after few weeks there was no considerable problem.

Visual acuity results in Group 'A' cases :

After about 6 weeks of operation the vision was recorded and simultaneously glasses of appropriate number were given. After correction with glasses out of 30 cases about 6% cases regained the vision of 6/6, about 50% cases 6/9 and 33% cases regained 6/24 vision. Thus about 92% cases were found to be having vision 6/12 or better than this. And only about 6% cases were found to have corrected vision of 6/18.

Table no. 5 shows visual acuity results in group 'A' patients.

Table - 5  
Showing visual acuity results in Group  
'A' cases

Sr. No.	Visual acuity	Without spectacle No.	With spectacle No.	Without spectacle %	With spectacle %
1.	6/6	-	02	06.67	
2.	6/9	03	15	49.99	
3.	6/12	17	11	36.66	
4.	6/18	08	02	06.67	
5.	6/24	02	-		
6.	6/36	-	-		
7.	6/60	-	-		

Cases for Group 'B' :

The details of the cases selected in group 'B' are given in the table no. 6 and 7.

Table - 6

Showing the type of cataract in group 'B' cases

Sl. No.	Type of the cataract in group 'B' patients	Cases	
		No.	%
1.	Mature cataract (Senile type)	15	100
2.	Submature cataract	00	00
	Total	15	100

As it is shown in the above table, all the 15 cases selected in group 'B' were of mature cataract (Senile type). Cases associated with diabetes, hypertension, glaucoma and high myopia and with history of any other chronic ocular problems were not taken in to account.

Table - 7

Showing the Age-sex distribution in group 'B' cases

Sl. No.	Age group	Sex		Total			
		Male No.	Male %	Female No.	Female %	No.	%
1.	41 - 50	-	-	-	-	-	-
2.	51 - 60	06	40.00	04	26.67	10	66.67
3.	61 - 70	03	20.00	02	13.33	05	33.33
4.	71 - 80	-	-	-	-	-	-
	Total	09	60.00	06	40.00	15	100.00

The details of the postoperative complications (early & late) of group 'B' cases are given in table no. 8 and 9, as below :

Table - 8  
Showing Early post-operative complications in group 'B' cases

Sl. No.	Complication	No.	Percentage
1.	Striate Keratitis	03	19.98
2.	Corneal oedema	01	06.67
3.	Iritis	02	13.32
4.	Shallow A.C.	-	-
5.	Hyphaema	-	-
6.	Secondary Glaucoma	-	-
7.	Distortion of pupil	-	-
8.	Incarceration of haptic into wound	-	-

As it is shown in the above table striate keratitis was observed in about 20% cases which disappeared in all cases within 3-5 days.

Corneal oedema was present in only one case (6.67%) which also subsided within a week.

The details of the postoperative complications (early & late) of group 'B' cases are given in table no. 8 and 9, as below :

Table - 8

Showing Early post-operative complications in group 'B' cases

S1. No.	Complication	No.	Percentage
1.	Striate Keratitis	03	19.98
2.	Corneal oedema	01	06.67
3.	Iritis	02	13.32
4.	Shallow A.C.	-	-
5.	Hyphaema	-	-
6.	Secondary Glaucoma	-	-
7.	Distortion of pupil	-	- -
8.	Incarceration of haptic into wound	-	-

As it is shown in the above table striate keratitis was observed in about 20% cases which disappeared in all cases within 3-5 days.

Corneal oedema was present in only one case (6.67%) which also subsided within a week.

Iritis was observed in about 13% cases. It was treated with the subconjunctival injection of decadron and atropine; topical corticosteroid drops and ointment and systemic anti-inflammatory drugs i.e. Brufen (400mg) 1 TDS. With this treatment it disappeared within three weeks.

Table - 9

Showing late post operative complications in  
Group 'B' cases

Sl. No.	Complication	No.	Percentage
1.	Persistent iritis	1	6.67
2.	Cystoid macular oedema	-	-
3.	Dislocation of lens	-	-
4.	Flashing of light	-	-

During late postoperative period, the main and only complication was persistent iritis which was observed in 6.67% cases. It was treated with the systemic corticosteroid alongwith the subconjunctival injection of decadron and atropine and topical instillation of corticosteroids drops, and it subsided after 7-8 weeks.

VISUAL ACUITY RESULTS :

The visual acuity recorded after 6 weeks of post-operative period. Details of which are given below in the table no. 10.

Table - 10

Showing visual acuity results in group 'B' cases

Sl. No.	Visual acuity	Visual acuity without correct- ion with glasses		Visual acuity with correction with glasses	
		No.	%	No.	%
1.	6/6	-	-	92	13.32
2.	6/9	09	69.99	10	66.67
3.	6/12	06	49.99	03	19.98
4.	6/18	-	-	-	-
5.	6/24	-	-	-	-
6.	6/36	-	-	-	-
<b>Total</b>		<b>15</b>	<b>100.00</b>	<b>15</b>	<b>100.00</b>

As shown in the above table in 13.32% cases, the final visual acuity, after correction with glasses, achieved was 6/6 and in 66.67% cases, it was 6/9 and in 19.98% cases, it was 6/12.

Thus in about 80% cases the final visual acuity improved to 6/9 or better than this, which in about 20% cases final visual acuity improved to 6/12.

Table no. 11 and 12 show the comparison of the post operative complication in group 'A' and group 'B' cases.

Table - 11

Showing Early postoperative complications

Sl. No.	Complications	Group 'A' cases		Group 'B' cases	
		No.	%	No.	%
1.	Striate Keratitis	11	36.67	03	20.00
2.	Corneal oedema	03	09.99	01	06.67
3.	Iritis	08	26.64	02	13.32
4.	Shallow A.C.	02	06.67	-	-
5.	Hyphaema	02	06.67	-	-
6.	Secondary Glaucoma	02	06.67	-	-
7.	Distortion of pupil	01	03.33	-	-
8.	Incarceration of haptic into wound	01	03.33	-	-

Table - 12

Showing Late postoperative complications

Sl. No.	Complications	Group 'A' cases		Group 'B' cases	
		No.	%	No.	%
1.	Persistent iritis	04	13.32	01	06.67
2.	Cystoid macular oedema	02	06.67	-	-
3.	Dislocation of lens	01	03.33	-	-
4.	Flashing of light	02	06.67	-	-

As shown in the above table, the early post-operative complications, in group 'B' cases are less than the group 'A' cases. For example striate keratitis was present in 36% cases in group 'A' cases, while in group 'B', it was found only in 20% cases, like wise corneal oedema was present in about 10% cases of group 'A', while it was present in 6% cases of group 'B' and iritis was present in 26% cases of group 'A', while it was present only in 13% cases of group 'B'.

Thus the post operative complications in group 'B' cases are not only fewer but their percentage is also less than the group 'A' cases.

Similarly late postoperative complications are also less in group 'B' cases than group 'A' cases; for example - persistent iritis was found only in 6% cases of group 'B' cases, while it was found in 13% cases of group 'A'; like wise cystoid macular oedema and distortion of pupil was noticed in group 'A' cases, while these were not observed in group 'B' cases.

Table - 13

Showing the comparison of corrected final visual acuity in group 'A' & group 'B' cases

Sl. No.	Visual acuity (V.A.)	Group 'A'			Group 'B'		
		Visual acuity corrected with glasses	No.	%	Visual acuity corrected with glasses	No.	%
1.	6/6	02	06.67		02	13.32	
2.	6/9	15	49.99		10	66.67	
3.	6/12	11	36.67		03	19.98	
4.	6/18	02	06.67		-	-	
5.	6/24	-	-		-	-	
6.	6/36	-	-		-	-	
7.	6/60	-	-		-	-	

Regarding the final visual acuity as it is clear from the above table that visual acuity is better in group 'B' cases than the group 'A' cases. For example on average about 80% cases of group 'B' are having vision of 6/12 or better than this while only about 55% cases of group 'A' are having vision of 6/12 or better than this. And 6/6 vision is obtained in 13% cases of group 'B' while it is present only in 6% of group 'A' cases.

Thus visual improvement has been found much better in group 'B' cases than in the group 'A' cases.



## DISCUSSION

## DISCUSSION

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To evaluate the outcome of anterior & posterior chamber lens implantation surgery in the light of related complications, present study was conducted on 45 patients suffering from cataract. Cases were selected from the patients attending Ophthalmology O.P.D. during the period from July, 1990 to July, 1991.

Diagnosis of cataract was made on the basis of history and clinical examination supplemented with relevant investigations.

Cases were divided on the basis of choice of lens implantation into two groups 'A' & 'B', consisting of 30 and 15 patients respectively. Most of the patients of group 'A', in which anterior chamber lens implantation was planned had senile cataract (24 cases were of mature cataract and 5 cases were of submature cataract) excepting one case who had traumatic cataract.

Cataract operation performed in group 'A' patients involved intracapsular lens extraction (ICLE) techniques excluding one patient of traumatic cataract in which extracapsular (ECLE) was done.

In group 'B' 15 patients were selected for posterior chamber lens implantation. All were of mature cataract of senile type. Cataract operation (ECLE in all the case) was performed and lens was implanted in the posterior chamber in all the cases.

After lens implantation post-operative complications (early & late) were observed and treated accordingly. And after about 6 weeks vision was corrected with the help of the glasses and final visual acuity was recorded in each case.

Follow up of the patients was done and then the postoperative complications and final visual acuity were compared in both the groups; and these complications were also compared with the results of the other workers. The details of which given below.

During early postoperative period striate keratitis was found in the cases of both the groups, but in group 'A' cases it was observed in 36.67% cases. This was very near to the findings of Daljeet Singh (1983), who reported striate keratitis in 29.4% cases. O.P. Billiore (1986) found striate keratitis in 29.5% cases with rigid anterior chamber lenses and in 19.82% cases with flexible lenses in a study of 500 patients.

N.S. Raju (1983) reported lower incidence of striate keratitis in only 16.6% cases while R.K. Mishra (1985) reported higher incidence in 70% cases. M.C. Nahata (1983) also reported higher incidence of striate keratitis in 75% cases.

In group 'B' cases during early post-operative period, the incidence of striate keratitis was observed in 20% cases. While Sudhaker J, Ravindran R.D. and Natichior G. has reported striate keratitis only in 7.3% cases of posterior chamber lens implantation. And Subhash P Kadam, Barodo (1989) reported striate keratitis in 12.5% cases of posterior chamber lens implantation.

In the present study slightly higher incidence of striate keratitis was observed in posterior chamber cases. And the most likely cause of this could be unavailability of the proper instruments. So that there was excessive handling of cornea during lens implantation in the posterior chamber.

In our study, corneal oedema was present in about 10% cases of group 'A'. M.C. Nahata (1983) reported incidence of corneal oedema in 15% cases. O.P. Billore (1986) reported oedema only in 16.72% cases with flexible type of anterior chamber lenses (and in 07.9% cases with flexible type of anterior chamber lenses). So the incidence in our study is almost similar to the other studies.

While in group 'B' cases corneal oedema was observed in about 6% cases. Sudhaker J, Ravindran R.D. and Natichiar reported the incidence of corneal oedema in only 1.7% cases. The most probable cause of higher incidence in our study may be, trauma to the cornea.

Shallow anterior chamber was observed in about 6% cases in our study in group 'A' cases. During early post-operative period Daljit Singh et al (1984-86) reported lower incidence of only 1.6%. However, this complication was not observed in group 'B' cases.

Hyphaema was observed in 6.67% cases of group 'A' in our study. S.Tony Fernandez and Sebastin Pions, Angamally (1978) reported almost similar incidence of hyphaema in 6.4% cases. Subhash P. Kadam (1989) reported lower incidence of hyphaema in 2% cases. However, hyphaema was not observed in group 'B' cases in our study. While Subhash P Kadam reported incidence of hyphaema in 10% cases. S.Tony Fernandez and E.J. Mani Angamally reported incidence of hyphaema in 4.0% cases of posterior chamber lens implantation.

Iritis during early postoperative period was noticed in 26.67% cases in our study in group 'A' cases.

M.C. Nahata (1983) also reported incidence of iritis in 20% cases. Daljeet Singh et al (1983) reported slightly lower incidence of iritis in 11.5%; Subhash P. Kadam (1987) reported iritis in 15.7% cases and in 1989 he reported iritis in 11.34% cases. O.P. Billore reported iritis in 14.7% with rigid anterior chamber lenses and in 9.8% cases with flexible anterior chamber lenses. S.Tony Fernandez and Sebastin Pious, Angamally (1978) reported iritis in 20% case during early postoperative period.

Iritis during early postoperative period in group 'B' was observed in 13.32% cases in our study. Sudhaker J, Ravindran RD and Natichior G, also reported incidence of iritis in 4.8% cases of posterior chamber lens implantation during early postoperative period. Subhash P. Kadam (1989) observed iritis in 7.50% cases.

In our study, during late postoperative period in group 'A' cases, the incidence of the persistent iritis was found in 13.32% cases. S. Tony Fernandez reported iritis during late postoperative period in 4% cases. N.S. Raju (1983) reported persistent iritis in 8.66% cases.

While in group 'B' cases during late postoperative period the incidence of persistent iritis was observed in 6.67% cases. Sudhaker J, Ravindran RD and Natichior G, reported persistent iritis in 4.2% cases.

So the incidence of the iritis during early post-operative period in both the groups is some what similar to the incidence reported in the studies by other workers. But the incidence of the persistent iritis during late postoperative period in both the group 'A' & 'B' is higher in our study than the other studies. The cause of this higher incidence could be improper treatment of the iritis during late postoperative period because patients did not come for regular follow up.

In the present study, distortion of the pupil was observed in 3.33% cases in group 'A'. The cause of the distortion of pupil was pressure of the haptic of the lens over the iris. However, this complication was not noticed in group 'B' cases.

Secondary glaucoma during early postoperative period was observed in 6.67% cases of group 'A'. S.Tony Fernandez & Sebastin Pious, (1978) reported secondary glaucoma in 6.4% cases. Subhash P. Kadam (1989) reported secondary glaucoma in 2.67% cases. This complications was

not noticed during late postoperative period in group 'A' cases. Also not noticed in group 'B' cases.

Incarceration of the haptic into the wound was also observed in 3.33% cases of group 'A'. The cause of this was improper suturing of the wound.

Thus postoperative complications in group 'A' as well as in group 'B' cases were almost very near to the complications reported by other workers in their studies.

Regarding visual acuity in the present study, in group 'A' cases final visual acuity (after postoperative correction with glasses) of 6/6 was achieved in 6.67% cases, 6/9 in about 50% cases, 6/12 in 36.67% cases and 6/18 in 6.67% cases.

Thus in about 93% cases 6/12 or better vision was achieved and in 6% cases 6/18 or less vision was achieved.

J. Walt in 1984 reported 6/12 or better vision in 92% cases and less than 6/12 in 8% cases in a group of 181 cases. S. Bharti et al reported 6/6 vision in 36.70% cases, 6/9 in 47.46% cases, 6/12 - 6/18 in 12% cases, 6/24 - 6/36 in 3% and 6/60 in 63% cases. Y.M. Paranjpe (1983) reported 6/6 visual acuity in 16% cases, 6/12 in 84% cases. O.P. Billore (1986) reported 6/6 - 6/12 vision

vision in 78% cases, 6/18 - 6/36 in 15% cases and 6/60 in 7% cases. S. Tony Fernandez (1986) reported 6/6 - 6/12 vision in 70% cases, 6/18 - 6/36 in 26.2% cases.

In group 'B' cases the postoperative visual acuity (after correction with glasses) achieved is 6/6 in 13.32% cases, 6/9 in 66.67% cases and 6/12 in 20% cases.

Almost similar results of visual acuity reported by S. Tony fernandez and E.J. Mani Angamally (1978) in posterior chamber cases and vision achieved was - 6/6 in 16% cases, 6/9 - 6/18 in 82% cases, 6/60 in 2% cases.

However, Sudhaker J, Ravindran RD and Natichier G, reported slightly less achievement of visual acuity in cases of posterior chamber lens implantation i.e. 6/6 - 6/9 vision in 57.1% cases; 6/12 - 6/18 vision in 31.5% cases; 6/24 - 6/60 in 6.2% cases and 6/60 in 2.2% cases.

Thus final visual acuity achieved in group 'A' and 'B' cases was very near to the results reported by other workers in their studies.



## SUMMARY

## SUMMARY

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Development of the cataract, most of the time is a normal aging process, and if it is not treated, then it causes not only great diminution of the vision, but other ocular complications also. Now a days the best method of treatment of the cataractus lens is its surgical removal. However, removal of the lens leaves its first and unavoidable complication that is - aphakia. And this complication can be managed by many methods but the most accepted and recent method is intra-ocular lens implantation either into anterior chamber or posterior chamber.

But lens implantation is itself not free from the postoperative ocular complications. However, the incidence of the complications in anterior chamber lens implantation are different from these in post chamber lens implantation and we have to select the procedure which is less complicated and easy to perform.

Therefore, present study is carried out for the comparative evaluation of the postoperative complications in anterior as well as in posterior chamber lens implantation to reach the conclusion that which method (anterior or posterior) of lens implantation is better for the correction of the aphakia.

Cataract patients were admitted in the department of Ophthalmology, M.L.B. Medical College, Hospital, Jhansi and were divided into Groups 'A' & 'B'.

In Group 'A' 30 patients were admitted for anterior chamber lens implantation and in Group 'B' 15 patients for posterior chamber lens implantation. Thorough general systemic and local examination was done in every patients and routine investigations were carried out. Cataract operation was performed and lenses were implanted into the anterior and posterior chamber accordingly.

After lens implantation patients were followed up for the study of postoperative complications in both the groups. Complications were noted in the form of early post-operative complications i.e. upto one week, and late post-operative complications i.e. after one week. In this way post-operative complications in both the groups were observed, treated and compared with each other and also with other studies.

#### POST OPERATIVE COMPLICATIONS IN GROUP 'A' CASES :

During early postoperative period in group 'A' cases striate keratitis was found to be most frequent complication and observed in 36.67% cases. However, it disappeared in all the cases. This incidence of striate

keratitis is very near to the findings of Daljeet Singh (1983), who observed striate keratitis in 29.4% cases and O.P. Billare (1986), who observed striate keratitis in 29.5% cases.

Iritis was noticed in 26.67% cases. And iritis during late postoperative period was observed in 13.32% cases in our study. However, with the treatment, iritis disappeared in all the cases within three weeks.

The incidence of the iritis in our study is found to be slightly higher than the other studies, and the cause of higher incidence could be excessive handling of the iris during operation and improper post operative treatment of the iritis because most of the rural patients were not coming regularly for their follow up.

During early postoperative period other less frequent complications observed were corneal oedema in 10% cases, shallow anterior chamber in 6.67% cases, secondary glaucoma in 5.57% cases, hyphaema in 6.67% cases, distortion of the pupil in 3.33% cases and incarceration of the haptic into the wound in 3.33% cases.

#### POST-OPERATIVE COMPLICATIONS IN GROUP 'B' CASES :

During early post operative period the main complication was striate keratitis and it was observed in 19.98% cases. This disappeared in all the cases within 3-5 days.

Iritis was noticed in 13.32% cases but with the treatment, this disappeared in all the cases within few weeks.

Corneal oedema was observed in 6.67% cases and it got cleared in all the cases within a week.

During late postoperative period persistent iritis was present in 6.67% cases, but with the treatment it disappeared within 7-8 weeks.

In general, the incidence of the postoperative complications (early & late) is slightly higher in our study than the other studies, and most likely cause of the this higher incidence, could be excessive handling of cornea, iris and other structures due to unavailability of the proper instruments & improper treatment because most of the rural patients were not coming for regular follow up.

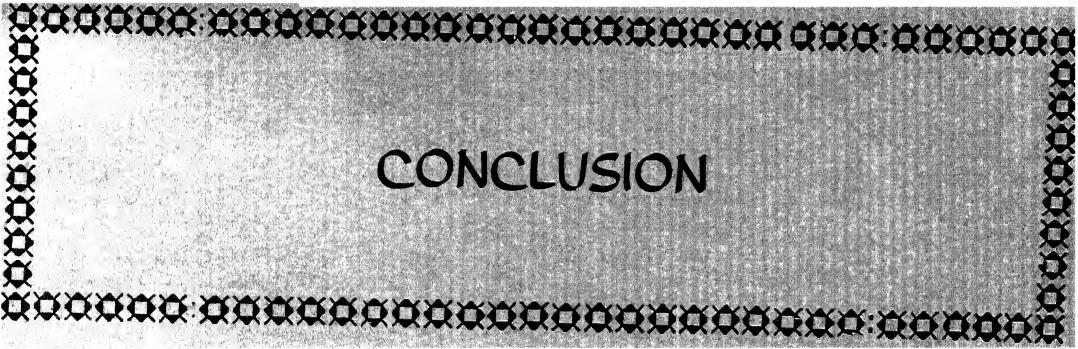
#### VISUAL ACUITY :

##### Group 'A' Cases :

The final visual acuity achieved after correction with glasses is upto 6/9 or better than this in 57% cases and 6/12 in 36.67% cases.

##### Group 'B' Cases :

The final visual acuity achieved after correction with glasses is upto 6/9 or better than this in 80% cases and 6/12 in 20% cases.



## CONCLUSION

## CONCLUSION

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1. For the correction of aphakia following cataract surgery, posterior chamber lens implantation is better than the anterior chamber lens implantation.
2. Incidence of post-operative complications is less in posterior chamber lens implantation as compared to the anterior chamber lens implantation.
3. The final visual acuity achieved both qualitatively as well as quantitatively, is better in posterior chamber lens implantation than in anterior chamber lens implantation.
4. To perform posterior chamber lens implantation is slightly more difficult, time taking and requires more experience, operative microscope and other modern instruments.
5. Choice of the intraocular lens implantation is posterior chamber in well equipped hospitals, while anterior chamber lens implantation in less equipped hospital or and at periphery.
6. Major early post-operative complications in anterior chamber lens implantation cases are striate keratitis, iritis and corneal oedema, while main late post-operative complication is iritis.

7. Main early post-operative complications in posterior chamber lens implantation cases are striate keratitis and iritis while main late post-operative complication is iritis.

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Appendix - I

MAHARANI LAXMI BAI MEDICAL COLLEGE & HOSPITAL,  
JHANSI

PROFORMA FOR EXAMINATION

Case no. \_\_\_\_\_

- |  |  |
|--|--|
| 1. Name of investigator :                      | Details of patient :   |
| 2. Surgeon I/c                                 | 1. Name  |
| 3. Place : Medical College<br>Hospital, Jhansi | 2. Age/Sex....Wd/Bed...<br>3. Address:<br>4. Occupation :<br>5. Socio-economic status<br>6. In habit of taking<br>any intoxicant |
- 

A. PRESENTING SYMPTOMS

- 1.
- 2.
- 3.

B. A Brief history of present illness :PAST HISTORY :

H/o Diabetes  
Hypertension  
Any other

Family HistoryExaminations :General Examination

- CVS
- Respiratory System
- CNS
- Abdomen

Local Examination

- 1. Facial Symmetry
- 2. Eye Brows
- 3. Eye Lashes
- 4. Eye lids

Rt.Lt.

5. Conjunctiva - Bulbar  
                   - Limbal  
                   - Palpbral  
                   - Intermarginal strip
6. Cornea - Size  
                   - Shape  
                   - Surface  
                   - Curvature  
                   - Lustre  
                   - Transparency  
                   - Sensitivity
7. Anterior Chamber  
     i) Depth     Normal/Shallow/deep  
     ii) Contents - Colour  
                   - Nature  
                   - Flare if any
8. Iris - Colour  
                   - Surface  
                   - Pattern  
                   - Atrophy (if any)
9. Pupil - Size  
                   - Shape  
                   - Colour  
                   - Reaction to light  
                       . Direct  
                       . Consensual
10. Lens - Position  
                   - Transparency  
                   - Any other finding
11. Visual acuity :     RT.     LT.
12. Digital tension :

13. Tonometry : Schiotz :
- Applanation :
14. Fundoscopy :
15. Gonioscopy :
16. Perimetry :
17. S/L examination :
18. Diagnosis :

#### INVESTIGATIONS

- i) Urine examination
- ii) Blood routine examination
- iii) Blood Sugar

#### OPERATIVE HISTORY

1. Date of operation
2. Type of anaesthesia
3. Type of surgery
4. Use of visilon
5. Type of lens implantation  
- Power of the lens :

#### POST-OPERATIVE COMPLICATIONS :

1. Anterior chamber lens implantation
  - (a) Early postoperative complications
    - 1.
    - 2.
    - 3.
  - (b) Late postoperative complications
    - 1.
    - 2.
    - 3.
2. Posterior chamber lens implantation
  - (a) Early postoperative complications
    - 1.
    - 2.
    - 3.
  - (b) Late postoperative complications
    - 1.
    - 2.
    - 3.